

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims

1. (Currently amended) A precision dispensing tip for use with precision dispensing apparatus for delivering controlled amounts of viscous fluid in the form of drops to a selected location along a path on a surface comprising:

- a) a body having an inlet at one end adapted for connection in fluid communication with the precision dispensing apparatus and having an outlet at another end of the body;
- b) a fluid conducting passage in the body for connecting the inlet to the outlet, the passage having a first portion in the shape substantially of a frustum of a right circular cone converging in a direction immediately from the inlet to an intermediate location in the body and a second substantially cylindrical portion of constant diameter extending from the intermediate location to the outlet, the first portion having an axial length extending from the inlet to the intermediate location and the second portion having an axial length extending from the intermediate location to the outlet;
- c) so that the passage conducts the viscous fluid from the inlet to the outlet in a continuous and uninterrupted manner and in a manner avoiding introduction of turbulence to fluid flow in the

tip so as to maintain consistency in the size and shape of the drops of the viscous fluid applied to the path along the surface; and

- d) wherein the body has a longitudinal axis and the first and second portions extend along the axis and wherein the outlet has a diameter such that the diameter of a drop of viscous fluid leaving the outlet is directly proportional to the ratio of the axial length of the second portion to the axial length of the first portion, the axial length of the first portion being at least three times the axial length of the second portion and the inlet having a diameter at least four times the diameter of the outlet.

2. (Original) A dispensing tip according to claim 1, wherein the second portion of the passage has a diameter in a range from about 0.003 inch to about 0.030 inch.

3. (Original) A dispensing tip according to claim 1, wherein the body is of ceramic material.

4. (Original) A dispensing tip according to claim 1, wherein the body is of injection molded ceramic material.

5. (Original) A dispensing tip according to claim 1, wherein the body is of injection molded zirconia ceramic material.

6. (Original) A dispensing tip according to claim 1, further comprising a protective housing.

7. (Original) A dispensing tip according to claim 6, further including a standoff member extending from the housing for contacting a surface to which fluid is to be dispensed for spacing the outlet of the tip from the surface.

8. (Cancelled)

9. (Currently amended) A precision dispensing tip for use with precision dispensing apparatus for delivering controlled amounts of viscous fluid in the form of drops to a selected location along a path on a surface comprising:

- a) a monolithic body of ceramic material having an inlet at one end adapted for connection in fluid communication with precision dispensing apparatus and having an outlet at another end of the body;
- b) a fluid conducting passage in the body for connecting the inlet to the outlet, the passage being shaped to conduct fluid from the inlet to the outlet in a continuous and uninterrupted manner, said passage having a first portion converging in a direction immediately from the inlet and meeting a second portion of substantially constant cross-section extending toward the outlet, the first portion having a length extending from the inlet to the meeting of the first and second portions and the second portion having a length extending from the meeting of the first and second portions to the outlet, the length of the first portion being at least three times the length of the second portion; and

- c) the passage conducting the viscous fluid from the inlet to the outlet in a continuous and uninterrupted manner and in a manner avoiding introduction of turbulence to the flow of the viscous fluid in the tip so as to maintain consistency in the size and shape of the drops of the viscous fluid applied to the path along the surface.

10. (Original) A dispensing tip according to claim 9, wherein the body is of injection molded ceramic material.

11. (Original) A dispensing tip according to claim 9, wherein the body is of injection molded zirconia ceramic material.

12. (Original) A dispensing tip according to claim 9, wherein the outlet has a diameter in the range from about 0.003 inch to about 0.030 inch.

13. (Withdrawn) A method of precision dispensing controlled amounts of fluid to a selected location comprising:

- a) providing a dispensing tip having an inlet for receiving fluid from precision dispensing apparatus, an outlet for discharging fluid to the location and a passage between the inlet and outlet shaped to define a continuous and uninterrupted fluid flow from the inlet to the outlet;
- b) introducing fluid to the inlet of the dispensing tip;

- c) funneling the flow of fluid from the inlet toward the output;
- d) transitioning the flow to a constant cross-section flow into the outlet; and
- e) discharging the fluid from the outlet to the location in a body of fluid having a dimension in the range from about 0.003 inch to about 0.030 inch.

14. (Previously presented) A dispensing tip according to claim 9, in combination with a protective housing.

15. (Previously presented) A dispensing tip according to claim 14, further including a standoff member extending from the housing for contacting a surface to which fluid is to be dispensed for spacing the outlet of the tip from the surface.

16. (Previously presented) A dispensing tip according to claim 9, wherein the body has a longitudinal axis, the first and second passage portions extending along the axis and wherein the diameter of a drop of fluid leaving the outlet is directly proportional to the ratio of the axial length of the second passage portion to the axial length of the first passage portion.

17. (New) Precision dispensing apparatus for delivering controlled amounts of viscous fluid in the form of drops to a selected location along a surface comprising a dispenser containing viscous fluid and having an outlet and a precision dispensing tip operatively connected to the dispenser, the precision dispensing tip comprising:

- a) a body having an inlet at one end connected in fluid communication with the outlet of the dispenser and having an outlet at another end of the body;
- b) a fluid conducting passage in the body for connecting the inlet to the outlet; the passage having a first portion in the shape substantially of a frustum of a right circular cone converging in a direction immediately from the inlet to an intermediate location in the body and a second substantially cylindrical portion of constant diameter extending from the intermediate location to the outlet, the first portion having an axial length extending from the inlet to the intermediate location and the second portion having an axial length extending from the intermediate location to the outlet;
- c) so that the passage conducts the viscous fluid from the inlet to the outlet in a continuous and uninterrupted manner and in a manner avoiding introduction of turbulence to fluid flow in the tip so as to maintain consistency in the size and shape of the drops of the viscous fluid applied to the surface; and
- d) wherein the body has a longitudinal axis and the first and second portions extend along the axis and wherein the outlet has a diameter such that the diameter of a drop of viscous fluid leaving the outlet is directly proportional to the ratio of the axial length of the second portion to the axial length of the first portion, the axial

length of the first portion being at least three times the axial length of the second portion and the inlet having a diameter at least four times the diameter of the outlet.

18. (New) Apparatus according to claim 17, wherein the second portion of the passage has a diameter in a range from about 0.003 inch to about 0.030 inch.

19. (New) Apparatus according to claim 17, wherein the body is of ceramic material.

20. (New) Precision dispensing apparatus for delivering controlled amounts of viscous fluid in the form of drops to a selected location along a surface comprising a dispenser containing viscous fluid and having an outlet and a precision dispensing tip operatively connected to the dispenser, the precision dispensing tip comprising:

- a) a monolithic body of ceramic material having an inlet at one end connected in fluid communication with the outlet of the dispenser and having an outlet at another end of the body;
- b) a fluid conducting passage in the body for connecting the inlet to the outlet, the passage being shaped to conduct fluid from the inlet to the outlet in a continuous and uninterrupted manner, said passage having a first portion converging in a direction immediately from the inlet and meeting a second portion of

substantially constant cross-section extending toward the outlet, the first portion having a length extending from the inlet to the meeting of the first and second portions and the second portion having a length extending from the meeting of the first and second portions to the outlet, the length of the first portion being at least three times the length of the second portion; and

- c) the passage conducting the viscous fluid from the inlet to the outlet in a continuous and uninterrupted manner and in a manner avoiding introduction of turbulence to the flow of the viscous fluid in the tip so as to maintain consistency in the size and shape of the drops of the viscous fluid applied to the surface.

21. (New) Apparatus according to claim 20, wherein the dispensing tip outlet has a diameter in the range from about 0.003 inch to about 0.030 inch.